

NOVEMBER/DECEMBER 2025

**23UFEL14 — FUNDAMENTALS OF  
ELECTRONICS (FC)**

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State Coulomb's law.
2. What is electric potential?
3. Mention two types of resistors.
4. Write the colour code for a 1 K ohm resistor.
5. State the Faraday's law of electromagnetic induction.
6. Define mutual inductance.
7. What is dielectric constant?
8. State the principle of a capacitor.
9. How doping is done in semiconductors?
10. What is hole current?





SECTION B — ( $5 \times 5 = 25$  marks)

Answer ALL questions.

11. (a) State and explain Coulomb's law in vector form.

Or

- (b) Derive the expression for electric intensity due to a point charge.

12. (a) How to calculate Resistance value using colour code and explain its examples?

Or

- (b) How do you test resistance using a multimeter? Explain.

13. (a) Derive the expression for energy stored in an inductor.

Or

- (b) Explicate Lenz's law with an example.

14. (a) Explain the principle of a parallel plate capacitor.

Or

- (b) Determine the energy stored in a charged capacitor.

15. (a) Explain the energy band diagram for conductors, insulators, and semiconductors.

Or

- (b) Differentiate between intrinsic and extrinsic semiconductors.

SECTION C — ( $3 \times 10 = 30$  marks)

Answer any THREE questions.

16. Derive the expression for electric intensity and potential due to a uniformly charged conducting sphere at a point (a) outside, (b) on and (c) inside the sphere.

17. Obtain formulas for the equivalent resistance of resistors connected in series and parallel.

18. Find the expression for mutual inductance between two coils.

19. Derive the expression for capacitance of a parallel plate capacitor (a) without dielectric, (b) with dielectric.

20. Explain the working principle and VI characteristics of a diode.